

Claims

1. An acoustic synthesis and spatialization method,
in which a synthetic sound to be generated is
5 characterized by the nature of a virtual acoustic
source and its position relative to a chosen
origin,
characterized in that comprises a joint step
consisting in determining parameters including at
10 least one gain, for defining, at the same time:
- a loudness characterizing the nature of the
source, and
- the position of the source relative to a
predetermined origin.
- 15 2. The method as claimed in claim 1, in which the
spatialization of the virtual source is performed
in an ambisonic context, characterized in that it
comprises a step for calculating gains associated
20 with ambisonic components in a spherical harmonics
base.
3. The method as claimed in claim 1, in which the
synthetic sound is intended to be reproduced in a
25 holophonic, or binaural, or transaural context, on
a plurality of reproduction channels,
characterized in that, during said joint step, a
delay between reproduction channels is also
determined, to define at the same time:
30 - a triggering instant of the sound characterizing
the nature of the source, and
- the position of the source relative to a
predetermined origin.
- 35 4. The method as claimed in claim 3, characterized in
that the nature of the virtual source is
parameterized at least by a temporal loudness
variation, over a chosen duration and including a

sound triggering instant.

5. The method as claimed in claim 4, characterized in that said variation comprises at least:
- 5 - an instrumental attack phase,
 - a decay phase,
 - a sustain phase, and
 - a release phase.
- 10 6. The method as claimed in one of claims 3 to 5, characterized in that the spatialization of the virtual source is performed by a binaural synthesis based on a linear breakdown of transfer functions, these transfer functions being
- 15 expressed by a linear combination of terms dependent on the frequency of the sound ($L(f)$) and weighted by terms dependent on the direction of the sound (τ_R , τ_L , C , D).
- 20 7. The method as claimed in claim 6, characterized in that the direction is defined by at least one bias angle (θ) and, preferably, by a bias angle (θ) and an elevation angle (ϕ).
- 25 8. The method as claimed in one of claims 6 and 7, characterized in that the position of the virtual source is parameterized at least by:
- a number of filterings, dependent on the acoustic frequency ($L_i(f)$),
- 30 - a number of weighting gains each associated with a filtering, and
 - a delay for each "left" and "right" channel.
- 35 9. The method as claimed in one of the preceding claims, characterized in that the nature of the virtual source is parameterized by at least one acoustic timbre, by associating the chosen relative loudnesses with harmonics of a frequency

corresponding to a pitch of the sound.

10. The method as claimed in one of the preceding
claims, characterized in that it provides for an
5 acoustic synthesis engine specifically for
generating spatialized sounds, relative to said
predetermined origin.
11. The method as claimed in claim 10, in which the
10 synthesis engine is implemented in a music editing
context, characterized in that the method also
provides for a man-machine interface to place the
virtual source in a chosen position relative to
the predetermined origin.
12. The method as claimed in claim 11, taken in
15 combination with claim 6, in which a plurality of
virtual sources to be synthesized and spatialized
are provided, characterized in that each source is
20 assigned to a respective position.
13. A module for generating synthetic sounds,
comprising in particular a processor,
characterized in that it also includes a working
25 memory specifically for storing instructions for
implementing the method as claimed in one of the
preceding claims.
14. A computer program product, stored in a memory of
30 a central processing unit or a terminal, in
particular a mobile terminal, or on a removable
medium specifically for cooperating with a drive
of said central processing unit, characterized in
that it comprises instructions for implementing
35 the method as claimed in one of claims 1 to 12.